

PRESS RELEASE - PARIS - 15 JULY 2020

## How flies flip around on take-off from an upside-down position

**Flies are able to right themselves very quickly when taking off from an upside-down position. Scientists from the CNRS and from The Institute of Movement Science (ISM) at Aix-Marseille Université studying this phenomenon discovered the surprising way these insects begin by turning their bodies before their heads on take-off. The research will be published on 15 July 2020 in the *Journal of Experimental Biology*.**

With its legs pointing up and its wings down towards the floor, a fly can casually rest upside-down on a ceiling, but on take-off, it will right itself very quickly. Researchers from the CNRS and Aix-Marseille Université looked at how the insect flips itself around when taking off. With the aid of a high-speed camera, the scientists discovered that, contrary to cats which land on their feet by first turning their heads, flies begin by turning their bodies. The insect reorients itself within six wing beats at a speed of 10,000°/s, or approximately 30 revolutions per second. The whole movement takes approximately 0.05 s with the head turning 0.016 s later than the body.

According to the scientists, during take-off flies flip their bodies before their heads due to an inherent stabilisation reflex. Small stabilisers near the wings function as a type of gyroscope. Humans have a similar reflex which kicks in when they continue to stare at something despite turning their bodies around. In the study, the team included modelling which suggested that, during reorientation, the insect stabilises its visual system before resuming normal flight. The research aims to elucidate how flies orient themselves relative to a vertical axis. The scientists will now further their research to investigate the effect of light on a fly's orientation.





Fly reorientation captured by a high-speed camera filming at 1600 images per second © Anna Verbe

## Bibliography

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**How do hoverflies use their righting reflex?** Anna Verbe, Léandre P. Varennes, Jean-Louis Vercher, Stéphane Viollet, *Journal of experimental Biology*, 15 July 2020, 10.1242/jeb.215327

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